

Explanation for Terminology maxon X drives

Alignment of cable outlet in relation to motor (pitch) [°]

is the pitch in which angle distances of the cable output from the encoder to the cable output of the motor can be aligned (configured).

Ambient temperature [°C]

is the temperature range in which the drive may be operated. It results from the temperature resistance of the materials used and the viscosity of the bearing lubrication. At extremely low temperatures, significantly higher frictional torque is to be expected.

Average backlash no load [°]

is the angle of rotation that the gearhead output shaft rotates with the input shaft blocked when it is rotated from a stop position in the opposite direction. The stop position depends on the torque applied to the output shaft. It should be noted that with the output shaft blocked, due to the inverted reduction ratio, the motor shaft rotates through a much larger angle from stop to stop.

Cable length [mm]

is the configurable cable length including plug measured from the drive housing.

Continuous operation

is the operation area in which the drive may be continuously operated. The indicated area corresponds to maxon testing conditions where the drive is mounted on a plastic plate. If the thermal resistance between drive and air can be reduced (example 50%) then the drive may also be operated in a wider range.

Counts per turn

is the configurable number of pulses which, per revolution, are output on a channel.

Encoder length L_{max} [mm]

is the maximum length of the encoder up to the axial mounting surface of the motor. The necessary encoder flange between motor and encoder is not contained in the encoder length.

Gearhead length L₁ [mm]

is the maximum length of the gearhead up to the axial mounting surface of the motor. The necessary gearhead flange between motor and gearhead is contained in the gearhead length.

Intermittent operation

is the operation area in which the drive may be operated for a short time. The maximum winding temperature must not be exceeded.

Max. continuous input speed [rpm]

is the maximum recommended input speed which may apply continuously at the output shaft. It is based on life span considerations. If this value is greatly exceeded, the life span can be shortened, the gear heats up more and more noise is generated.

Max. continuous output power [W]

is the maximum mechanical power that the motor can output continuously without overheating.

Max. continuous torque [Nm]

is the maximum torque that can be applied permanently to the output shaft. If it is exceeded, the life span is significantly shortened.

Max. counts per turn

is the maximum possible number of counts per turn. For EASY encoders, the counts per turn can be configured.

Max. efficiency [%]

is the optimal ratio between power input and power output. The specified efficiency for motors applies for loads above approx. half the continuous torque.

Max. intermittent input speed [rpm]

is the maximum input speed that may be applied for a short-time* at the input. It is based on life span considerations. Significantly exceeding this value can shorten the life span, the gearhead will heat up rapidly and the noise level will increase.

Max. intermittent torque [Nm]

is the maximum torque that can be applied for short time to the output shaft. If it is exceeded, the life span is significantly shortened.

Max. nominal torque [mNm]

is the maximum continuous torque that can be generated when operating with nominal voltage and nominal current at a motor temperature of 25 °C. It is at the limit of the continuous operating range of the motor. Higher torques will lead to impermissible heating of the winding.

Max. operating frequency [kHz]

is the maximum, electrical output frequency with which the encoder can be properly operated.

Max. permissible speed [rpm]

is the maximum recommended speed based on the commutation. For higher speeds, a reduction in the life span can be expected.

Max. transmittable continuous power [W]

is the maximum continuous output available at the output shaft without shortening the life span. When it is exceeded the life span is greatly reduced.

Max. transmittable intermittent power [W]

is the maximum output available for a short-time* at the output shaft. When it is exceeded the life span is greatly reduced.

No load speed [rpm] ±10%

is the speed at which the motor turns at nominal voltage and without load. It is approximately proportional to the applied voltage.

No load current [mA] ±50%

is the typical current that the unloaded motor draws when operating at nominal voltage. It depends on brush friction and friction in the bearings, and also increases with rising speed. No-load friction depends heavily on temperature, particularly with precious metal commutation. In extended operation, no-load friction decreases and increases at lower temperatures.

Nominal current [A]

is the current which, at an ambient temperature of 25° C and with continuous operation, heats the winding up to the maximum permissible temperature (= maximum permissible continuous current). As a result of additional frictional losses it decreases slightly when the speed increases.

Nominal voltage [V]

is the DC voltage on the motor connections on which all nominal data are based. Higher and lower voltages are permissible as long as they do not exceed the limit values.

Number of channels

is the number of available output channels (A, B, I).

Number of stages

is the number of gearhead stages connected in series.

Output stage

is designed for high torques. It can be configured to fit the specific application.

Plug pitch [mm]

is the distance between pins of the plug in mm.

Reduction

is the factor by which the speed of the gearhead output shaft is smaller than the motor speed (rounded value).

Speed constant k_n [rpm/V]

is the ideal no-load speed per 1 volt of applied voltage.

Supply voltage [V]

is the voltage range that may be applied to the encoder as DC voltage.

Terminal resistance R [Ω]

is the resistance measured at 25°C at the terminals (without cables) and determines the starting current at a given voltage. For graphite brushes it should be noted that resistance is load-dependent and the value only applies to large currents.

Torque constant k_M [mNm/A]

is the quotient from generated torque and applicable current. Also known as "specific torque".

Typical noise level [dBA]

is that statistical average of the noise level measured according to maxon standard (10 cm distance radially to the drive, no-load operation at a speed of 6000 rpm. The drive lies freely on a plastic foam mat in the noise chamber).

The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.

The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

Typical speed/torque gradient [rpm/mNm]

provides information on the strength of the motor. The smaller this value is, the stronger the motor is and the less the speed changes when the load fluctuates. It is calculated from the quotient of ideal no-load speed and ideal stall torque.

Weight [g]

is the weight of the drive component.

*) short-time

duration of max. 1 second

duration of max. 10% of the operating cycle

maxon Standard Specification

All product-specific information is based on maxon standard specification no. 100 and no. 102. These specifications can be found at www.maxonmotor.com, in the general terms and conditions.